

the scutellum, without a distinct median sulcus, but with a strong apical fovea, the posterior slope with a strong median sulcus. Abdomen closely and minutely punctured, rather sparsely clothed with very short silver-grey pubescence, which does not form apical fasciæ; second sternite very minutely and closely punctured on the sides, much more strongly and rather sparsely in the middle; the third and following sternites very sparsely and deeply punctured in the middle. Seventh tergite elongate-triangular, rather narrowly rounded at the apex, densely clothed with coarse reddish-gold pubescence. Eighth sternite rather narrowly truncate at the apex, the angles not produced. First recurrent nervure interstitial with the first transverse cubital nervure, second received just before the middle of the second cubital cell; third abscissa of the radius nearly twice as long as the second and about equal to the first. Six spines on the basal joint of the fore tarsus.

Hab. Mlanje, Nyasaland, 2300 ft. (*S. A. Neave*), October.

A very distinct species in colour, in the position of the first recurrent nervure, and in the even distribution of the pubescence of the tergites.

XIV.—*On Barnacles of the Genus Scalpellum from Deep-sea Telegraph-Cables.* By W. T. CALMAN, D.Sc.

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DURING the last few years the British Museum (Natural History) has received collections of deep-sea animals taken from telegraph-cables raised for repair in the Atlantic and in Oriental seas. Most of these collections have been obtained by the cable-ships of the Eastern and Associated Telegraph Companies, and the Museum is indebted to Mr. Walter Judd, Electrician-in-Chief of these companies, who has taken much trouble to facilitate the collecting and safe transmission of the specimens. The Museum is not less indebted to the captains and other officers, and particularly to the medical officers of the various ships, by whom the collections were actually made and who have supplied exact details of the positions and depths at which the specimens were taken.

The following is a list of the ships by which the specimens described in this paper were obtained, and indicates the

companies to which they belong and the areas in which they were working. The companies belonging to the group of the "Eastern and Associated Telegraph Companies" are distinguished by an asterisk:—

C./S. 'Britannia.'	*Eastern Telegraph Company.	Capo Verde Ids.
'Electra.'	do.	Gulf of Aden.
'Sherard Osborn.'	do.	Java-Australia.
'Norseman.'	*Western Telegraph Company.	Brazil.
'Patrol.'	*Eastern Extension, Australia, and China Telegraph Company.	Java-Australia.
'Recorder.'	*Eastern Extension, Australia and China Telegraph Company.	Java Sea.
'Colonia.'	Telegraph Construction and Maintenance Company.	Aden-Zanzibar.
'Henry Holmes.'	West India and Panama Telegraph Company.	West Indies.

The bulk of the collections consists of sessile organisms that were actually attached to the cables, and among these the barnacles are conspicuous by their numbers and, in many cases, by their large size. One of the specimens of *Scalpellum nudipes* mentioned below is among the largest of the pedunculate Cirripedes yet recorded.

While some species of deep-sea Cirripedes are known to have a very wide distribution, occurring in the Atlantic, the Indian, and the Pacific Oceans, there is some evidence that certain species are confined to more restricted habitats. Thus, two of the species recorded below (*S. nudipes* and *S. persoua*) have been only very recently described by Dr. Annandale from localities not far distant, and probably, indeed, from another part of the same cable.

The "new species" that are described here, like many of those already established in the genus *Scalpellum*, must not be taken too seriously. A large proportion of the known species of the genus have been described from solitary specimens or from a very few, and we are without the means for forming even the roughest estimate of the limits within which variation may occur. Further, even where a considerable number of specimens have been found growing side by side or attached to one another (as in the group of *S. bengalense* mentioned below), there is reason to believe that they may all belong to a single family, and that the uniformity of character which they show may be, in part, fraternal or filial rather than specific. At the same time

there is some evidence for the constancy of apparently trivial characters in specimens from widely remote localities. A striking example is afforded by *S. acutum*, of which I have been able to compare, side by side, specimens from the Kermadec Islands, the Gulf of Aden, and the Cape Verde Islands without finding any noteworthy differences.

The classification here adopted is that of Annandale (1910), who retains, in its full extent, the old genus *Scalpellum*, dividing it only into the two subgenera *Smilium* and *Scalpellum*, s. str. The criticisms of Annandale (1910, 1916) on the more elaborate schemes proposed by Hoek, by Pilsbry, and by Joleaud appear to be, on the whole, well founded.

List of Species.

- Scalpellum (Smilium) trispinosum*, Hoek. Java Sea, 73-175 fath.
 — (—) *nudipes*, Annandale. Java-Australia, 130-500 fath.
 — (—) *acutum*, Hoek. Gulf of Aden, 1200 fath., and Cape Verde Ids., 990 fath.
 — (—) *bengalense*, Annandale. Gulf of Aden, 260 fath.
 — (*Scalpellum*) *ecaudatum*, sp. n. Java Sea, 73-175 fath.
 — (—) *velutinum*, Hoek. Java-Australia, 400-700 fath., and Aden-Zanzibar, 600 fath.
 — (—) *annandalei*, sp. n. Gulf of Aden, 1200 fath., and Java-Australia, 700 fath.
 — (—) *regina*, Pilsbry. Pernambuco, 50-150 fath.
 — (—) *regulus*, sp. n. Java-Australia, 800-1500 fath.
 — (—) *alcockianum*, Annandale. Java-Australia, 700 fath.
 — (—) *jaldi*, sp. n. Java-Australia, 250-400 fath.
 — (—) *persona*, Annandale. Java-Australia, 400 fath.
 — (—) *portoricum*, Pilsbry. Porto Rico, 180 fath.
 — (—) *rubrum*, Hoek. Java Sea, 73-175 fath.
 — (—) *novæ-zelandiæ*, Hoek. Gulf of Aden, 1200 fath.
 — (—) *gruvelii*, Annandale. Gulf of Aden, 770-1200 fath.
 — (—) *laccadivicum*, Annandale. Java-Australia, 400 fath.

Scalpellum (Smilium) trispinosum, Hoek.

Scalpellum trispinosum, Hoek, Rep. 'Challenger' Cirripedia, 1883, p. 72, pl. vi. figs. 15, 16.

Calantica trispinosa, Krüger, Abh. Akad. Wiss. München, math.-phys. Kl., Suppl. Bd. ii. Abh. 6, 1911, p. 11, pl. i. fig. 1, pl. ii. figs. 12, 13.

Locality.—Lat. $7^{\circ} 35' S.$, long. $114^{\circ} 30' 30'' E.$ (Java Sea), 73-115 fath. C./S. 'Recorder.' 4 ♀, 1 ♂.

Remarks.—The specimens agree very closely indeed with the holotype, the largest exceeding it only a little in size (length of capitulum 15 mm.). The lines of growth on the valves are not so sharp or so conspicuous as in Hoek's figure. There is some variation as regards the acuteness of

the tergal apex, and the ocludent margins of both tergum and scutum may be either straight or concave. The carina has a broadly convex ridge in the middle of the roof, bordered by a shallow concavity on each side, and the parietes, which are broad above and narrow below, are inflected at a sharp angle. In a very small specimen (capitular length 4.5 mm.) the carina is more strongly curved than in larger specimens, and its apex, instead of projecting freely, enters between the terga.

Krüger's specimens reached a much larger size (capitular length 29 mm.), and, in some cases at least, the peduncle greatly exceeded the length of the capitulum.

The two subequal rami of the first cirrus have, in one specimen, 13 and 14 segments respectively: in the sixth cirrus the numbers are 21 and 19. The caudal appendages resemble those figured by Annandale for *S. nudipes*. The proportions of the penis and the structure of the mouth-parts agree in general with Krüger's account.

One of the hermaphrodites carried a single dwarf male, about 1.25 mm. in total length, wedged between the ocludent margins of the scuta on the outer surface of the adductor muscle. It differs considerably from Krüger's figure in having the valves of the capitulum much larger and more regularly formed. It resembles Darwin's figure of the male *S. villosum* ('Lepadidae,' pl. vi. fig. 4), except that the strongly curved rostrum is much larger, the scutum more than twice as wide as the tergum, and the integument without conspicuous spines, in these respects approaching Annandale's figure of the male *S. nudipes*. On one side the base of the rostrum has been cracked, separating off a small plate similar to those found by Annandale on each side of the carina in the male of *S. nudipes*, and suggesting that the latter plates are also due to accident.

Scalpellum (Smilium) nudipes, Annandale.

Scalpellum (Smilium) nudipes, Annandale, Journ. Straits Branch Roy. Asiatic Soc. no. 74, 1916, p. 287, pl. iv. fig. 1, pl. v. figs. 1-6, pl. vi. figs. 1, 2.

Locality.—Lat. $10^{\circ} 22' 30''$ S., long. $120^{\circ} 7' 30''$ E. (Java-Australia), 130-500 fathoms. 1 ♀, 1 ♂*.

* This specimen, transferred to the Museum some years ago from the Netley Hospital collection, bears on the label exactly the indications of position and depth given by Annandale for the holotype, with the additional information that, as he suspected, the latitude is south of the line. It may be assumed, therefore, that this specimen also formed part of the collection made by Capt. F. Worsley of the C. S. 'Sherard Osborn.'

Lat. $11^{\circ} 0'$ S., long. $121^{\circ} 30'$ E. (Java-Australia), 400 fathoms. C./S. 'Patrol.' 1 ♂.

Remarks.—The second of the two hermaphrodite specimens recorded above measures 63 mm. in length of capitulum by 47 mm. in breadth, and the peduncle is 87 mm. long by about 29 mm. in diameter in the middle. These dimensions are considerably greater than those recorded by Annandale, and show that the species reaches a size not exceeded, if it be attained, by any other member of the genus.

Certain slight differences from Annandale's description are shown by both specimens. The occludent basal angle of the tergum is by no means acute, but, as shown in Annandale's figure, clearly obtuse. The apices of both tergum and scutum may be straight or slightly recurved. The median latus (called inframedian and sometimes upper by Annandale) is quadrangular, not triangular; its posterior (or carinal) angle does not "dive beneath the carina," but is broadly truncated, forming a side, the shortest of the four, parallel to the margin of the carina. The apex of the carina is free for a short distance in one specimen, but not in the other; the roof is bluntly ridged in the middle and flat or faintly concave on each side; the parietes are very narrow and inflected. The basal half of the carina is straight in one specimen, gently curved in the other.

The first cirrus has the rami unequal in length, but with about the same number of segments (20 : 21 in one specimen). The penis is laterally compressed in one specimen, as in Annandale's description, but in the other it is swollen; it does not exceed one-half the length of the sixth cirrus.

Annandale states that this species "would find a place in the genus *Calantica* as redefined by Pilsbry in 1908." Pilsbry based the separation of *Calantica* from *Smilium* on the fact that in the former genus there is "no plate interposed below the tergum between scutum and carina," stating that "in other characters the two groups are almost identical." Presumably, therefore, Annandale's remark was suggested by his impression of the median latus as triangular in form, with its posterior angle overlapped by the carina. As shown above, however, this plate is distinctly quadrilateral, and it is interposed, as clearly as possible, between the scutum and the carina. *Scapellum nudipes* is, indeed, well fitted to show that the distinction between *Calantica* and *Smilium*, as defined by Pilsbry, is of little importance (as Pilsbry himself acknowledges), and that Annandale was justified in disregarding it. Dr. Annandale goes on to say, "In spite of the absence of

an upper latus in the hermaphrodite it seems to me to be probably related to such forms as *Scalpellum stratum*, Aurivillius, from the West Indies, and *S. sinense*, Annandale, from the seas of Burma and China." The affinity of *S. nudipes* with *S. sinense* is at once evident on comparing the excellent figures that Annandale has given of both species, but I am at a loss to understand the reference to *S. stratum*. In that species, as figured by Aurivillius, there are two median latera, the "upper latus" and the "inframedian latus"; in the present species, as in *S. sinense*, there is only one, whatever its proper designation may be.

Male.—A very small specimen was attached between the scuta below the level of the adductor muscle in the Netley Hospital specimen. It is less than half the size of the young male figured by Annandale, the capitulum measuring 1.1 mm. in length, and it carries to a greater degree the elongation of the capitulum which Annandale found to distinguish the young from the adult male, the breadth being only 0.7 mm. It further differs very remarkably in having only five calcified valves, there being no trace of a rostrum. The peduncle, about 0.6 mm. in length, is clothed with long setæ which are most numerous on the carinal side. The internal structure is not well preserved, but the mandible can be seen to have only three teeth besides the inner angle; there are six pairs of cirri and a short penis, and the caudal appendages are minute, unjointed, with two or three long apical setæ.

If this be really an earlier stage in the development of the male than those figured by Annandale—and there seems to be no reason to doubt that it is—it infringes in a very significant fashion the rule that "in all known males of the genus in which the calcareous armature is not degenerate there are six valves" (Annandale, *t. c.* p. 286). It would seem to indicate, in fact, that the rostrum forms no part of the "primitive armature," which is thus reduced to that typical of the family Lepadidæ.

Scalpellum (Smilium) acutum, Hoek.

- Scalpellum acutum*, Hoek, Rep. 'Challenger' Cirripedia, 1883, p. 80, pl. iii. fig. 19, pl. viii. fig. 12; id. 'Siboga' Exp. Cirripedia Pedunculata, 1907, p. 64, pl. vii. fig. 1.
S. (Smilium) acutum, Annandale, Rec. Ind. Mus. v. 1910, p. 154; id. Mem. Ind. Mus. vi. 1916, p. 129, pl. vii. fig. 4.
S. longirostrum, Gruvel, Bull. Mus. Paris, vi. 1900, p. 190; Exp. 'Travailleur' et 'Talisman,' Cirripèdes, 1902, p. 70, pl. ii. figs. 4, 5, pl. iii. figs. 17-21.

Localities. Lat. $14^{\circ} 54'$ N., long. $23^{\circ} 42'$ W. (Cape Verde Ids.), 990 fath. C./S. 'Britannia. 2 ♀.

Lat. $14^{\circ} 20'$ N., long. $52^{\circ} 30'$ E. (Gulf of Aden), 1200 fath. C./S. 'Electra.' 5 ♀ (N. Annandale det.).

Remarks. The seven specimens differ in no noteworthy respect from one another or from a specimen from 'Challenger' Station 170 (near Kermadec Islands), which is the sole survivor of the four syntypes. I find no reason to dissent from the conclusion of Hoek and Annandale that Gruvel's *S. longirostrum* is a synonym of this species, although in none of the specimens examined is the subcarina so tall as in Gruvel's figure. Two of our specimens, in which the capitulum measures 12 mm. in length, are twice as large as any hitherto recorded. The penis is short and the caudal appendages appear to be entirely wanting.

Scalpellum (Smilium) bengalense, Annandale.
(Text-fig. 1.)

Scalpellum bengalense, Annandale, Ann. & Mag. Nat. Hist. (7) xvii. 1906, p. 395; id. Illustr. Zool. 'Investigator,' Crust. Entom. pl. i. fig. 5, 1907; Stewart, Mem. Ind. Mus. iii. 1911, p. 44, pl. vi. figs. 7, 10.

S. (Smilium) bengalense, Annandale, Rec. Ind. Mus. v. 1910, pp. 147, 153, text-fig. 1; id. Mem. Ind. Mus. vi. 1916, p. 129, pl. vi. figs. 3, 4, pl. vii. fig. 3, pl. viii. figs. 1-5.

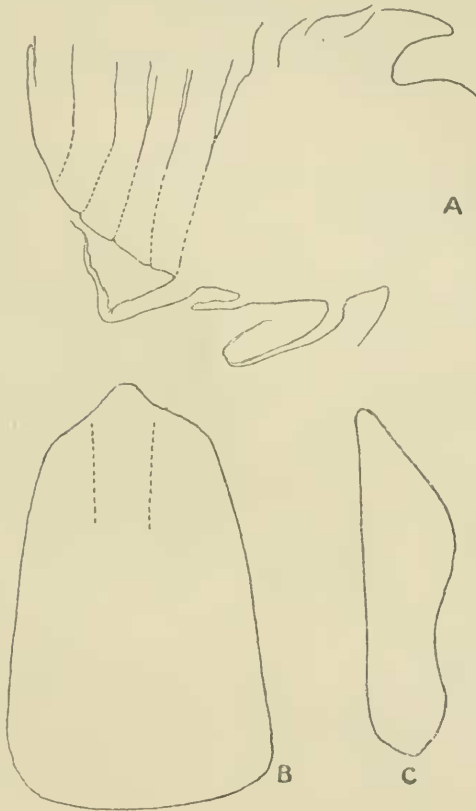
Locality. Lat. $12^{\circ} 43'$ N., long. $45^{\circ} 17'$ E. (Gulf of Aden), 260 fath. C./S. 'Colonia.' About 50 ♀, 3 ♂.

Remarks. Annandale has called attention to the resemblance which the hermaphrodite individuals of this species bear to those of *S. squamuliferum* Weltner—a resemblance so close that they "might almost have been considered specifically identical,"—while the males of the two species are remarkably different. The material now examined confirms this general statement, but shows that the distinguishing characters as given by Annandale require some modification.

Scalpellum bengalense was originally described from eight syntypes and the length of the capitulum was given as 10 mm. Annandale later stated that the type-specimens were immature and described "adult" specimens, but did not indicate their size; measurements taken from his figure published in 1916 show the capitular length to be about 14 mm. The statement as to the "immaturity" of the original specimens requires qualification. The British Museum received from

the Indian Museum in 1906 a specimen labelled "Ganjam Coast, 98-102 fathoms, Station 106, Marine Survey," and, although it is not so stated on the label, there can be little doubt that it is one of the eight syntypes. This specimen

Fig. 1.



Scalpellum bengalense.

A. Syntype. Outline of body, from the side, to show the dorsal filamentary appendages. B. Carina, C. Scutum, of male specimen.

measures only 9 mm. in length of capitulum, but it carries a mass of about 40 eggs in the mantle cavity; it is, therefore, sexually mature, although it has by no means attained

the full size or the definitive characters of the species. The present collection includes a number of specimens exceeding 20 mm. and one which measures 24 mm. in length of capitulum, and these differ considerably in general appearance from the small syntype.

For comparison I have examined a considerable series of *Scalpellum squamuliferum* from the Bay of Bengal, received from the Indian Museum, and four specimens—determined by Gruvel and mentioned by Annandale—stated to come from Singapore. The results of this comparison, as regards the hermaphrodite individuals, may be briefly stated as follows:—

S. bengalense. Valves thinner, separated by distinct interspaces, cuticular covering less opaque. Upper latus with basal margin about as long as the scutal and two-thirds or more of width of scutum, with scuto-tergal angle less acute (75° – 90°). Inframedian latus rhomboidal, hardly wider than high. Rostrum straighter as seen from side. Carina narrower, its width at base less than one-sixth of its length. Peduncle much less strongly annulated, the ridges separated by narrow and shallow grooves. Scelerites of peduncle ovoid or pyriform nodules, rarely more than twice as long as wide, arranged in oblique rows ascending from rostral to carinal side of peduncle and more or less interrupted on carinal side; even in large specimens these rows, while less regular than in small specimens, are not altogether masked by the transverse annulations. Dorsal filamentary appendages usually three in number, sometimes two, or (*teste* Annandale) absent.

S. squamuliferum. Valves thicker, all in contact or nearly so, cuticle more opaque. Upper latus with basal margin one-half to two-thirds as long as scutal, and more than one-half of width of scutum, with scuto-tergal angle more acute (50° – 65°). Inframedian latus nearly triangular and about twice as wide as high. Rostrum more curved. Carina wider, its width at base more than one-fifth of its length. Peduncle strongly annulated, the ridges separated by deep grooves which, in places, are wider than the ridges. Scelerites rod-shaped, up to five times as long as thick, crowded together on the ridges and absent from the furrows, so that the arrangement in oblique rows seen in the young is absent or obscured in large individuals; the

interruption of the rows on the carinal side is never extensive. Two dorsal filamentary appendages.

As regards the filamentary appendages, which Annandale calls "ovigerous lamellæ," and which he states are absent in *S. bengalense*, their presence in the syntype above mentioned and in the ten other specimens dissected shows that their absence must be considered exceptional. In the syntype (fig. 1, A) and in eight of the other specimens there are three of these filaments depending from the tergal surface of the prosoma, a short one being interposed between the two longer and nearer to the posterior one. In one specimen the short process is reduced to a papilla, and in another the posterior filament gives off two short branches near its base. In two specimens the two long filaments alone are present as in *S. squamuliferum*. Some half-dozen specimens of the latter species were examined as to this point, and all agreed with Annandale's description and figures.

In none of our specimens of either species is the peduncle much longer than the capitulum.

The *males*, of which only three specimens (two on one hermaphrodite) were found, agree very well in general form with Annandale's figure of 1910, less well with that of 1916 or with Stewart's figure of 1911. With regard to the valves of the capitulum, Annandale's description runs, "Capitulum entirely without calcified valves, or with a pair of amorphous scuta, or occasionally with minute terga in addition to such scuta" (Annandale, 1910, p. 154). Two of our specimens were removed for examination and found to disagree with this account. They show no signs of terga, but possess a pair of scuta (fig. 1, C) which by no means deserve the epithet "amorphous," and, in addition, a large and symmetrically-developed carina (fig. 1, B). The whole surface of capitulum and peduncle is covered with setæ arranged in regular transverse rows. Over the greater part of the surface these setæ are uniformly short, but towards the carinal side of the capitulum they become lengthened, forming a thick brush running along each margin of the carina but not covering the carina itself. This brush is roughly indicated in Annandale's figure of 1910.

The males were attached close to the margin of the scutum, external to the adductor muscle and just below a fold of cuticle which forms the lower lip of the mantle-opening. The slender peduncle is curved upwards and backwards over this lip, so that the body of the male projects into the mantle-

cavity and lies on the upper surface of the adductor. In *S. squamuliferum* the males which I have examined were attached in the fossa between the margins of the two scuta, external to or below the adductor muscle*.

Scalpellum (Scalpellum) ecaudatum, sp. n. (Text-fig. 2.)

Locality. Lat. 7° 35' S., long. 114° 30' 30" E. (Java Sea), 73-175 fath. C./S. 'Recorder.' 1 ♀ (holotype).

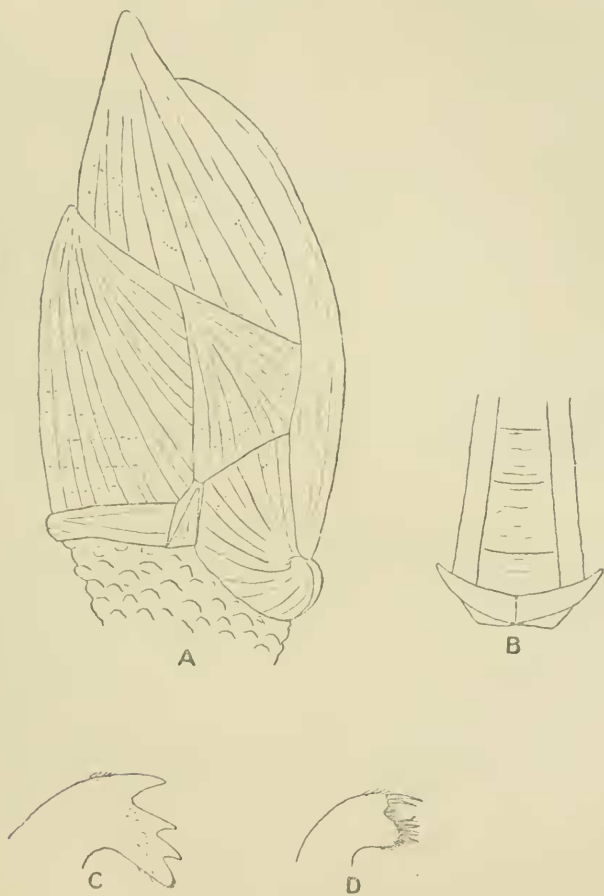
Description.—*Capitulum* compressed, rather elongated. *Valves* 14, all in contact, covered with a thin cuticle which does not conceal the sculpturing and carries minute setæ scattered, for the most part, in rows along the lines of growth. All the valves boldly sculptured with ribs radiating from the umbones; the lines of growth marked by fine and inconspicuous striæ. *Tergum* rather more than twice as long as wide, occludent margin straight, scutal margin nearly so, carinal margin convex, becoming straight or faintly concave near the acute apex. *Scutum* twice as long as wide, occludent margin convex, other margins straight, apex slightly overlapping tergum. *Carina* less than five times as long as it is wide at the base, evenly curved, with the umbo apical, entering between the terga, with a flat roof bordered by strong ridges; parietes rather deep, sloping inwards. *Upper latus* quadrangular, scutal margin very slightly concave, longer than the others, which are straight. *Rostrum* small, triangular, overlapped at sides by rostral latera. *Rostral latus* more than three times as wide as it is high, with a pair of horizontal ribs converging to the umbo. *Inframedian latus* very narrow, the sides converging to the umbo, then diverging slightly in a small apical extension beyond. *Carinal latus* with the recurved umbo projecting behind and to the side of the carina; the convex margin below the umbo less than half as long as the straight margin above it which abuts against the carina; the two latera meet below the square base of the carina (fig. 2, B).

Peduncle a little shorter than capitulum, closely set with imbricated scales in about 14 longitudinal rows of 11 scales each.

* The statements as to the place of attachment of the males in the genus *Scalpellum* in my account of the Crustacea in Lankester's 'Treatise on Zoology' (pt. vii, fasc. 3, p. 119) are, unfortunately, misleading. The less-modified males are, as a rule, attached in the position described above for *S. squamuliferum*. The more highly modified males are usually lodged in fossettes on the scutal margins. I know of no case where they are placed far within the mantle-cavity in this genus.

Mandible (fig. 2, C) with four teeth (including inner angle), the interval between the two distal nearly twice that between the two proximal teeth. *Maxillula* (fig. 2, D) with inner edge

Fig. 2.



Scalpellum ecaudatum, holotype.

- A. Capitulum, from the side. B. Base of carina and carinal latera.
C. Mandible. D. Maxillula.

concave or notched below a distal group of strong spines. *First cirrus* with rami unequal, of 9 and 11 segments, exopod

not greatly expanded. *Sixth cirrus* with rami of about 22 segments, middle segments bearing four pairs of spines anteriorly and a group of long distal setæ posteriorly; no conspicuous spines or setæ on inner face of endopod segments. *Caudal appendages* absent. *Penis* absent. No males were found.

Measurements. Length of capitulum 13.0 mm., breadth 7.0 mm.; length of peduncle 10 mm., diameter 4.5 mm.

Remarks. In Hoek's classification of the genus this species would find a place in the section (or subgenus) *Arcoscalpellum* and in "Group c," of which *S. hamatum* is the type. From most of the species forming this group it is distinguished by the strongly ribbed valves, resembling in this respect some species of Hoek's "Group d" (*S. formosum*, &c.); but it appears to be separated from all the members of both groups by the very low rostro-lateral plates. The structure of the appendages does not appear to have been described in any closely related species, but the complete absence of caudal appendages is, at all events, very unusual in the genus. Gruvel mentions, as the only example of this deficiency, the widely different *S. villosum*, and to this, as mentioned above, the hardly less different *S. acutum* must now be added.

Scalpellum (Scalpellum) velutinum, Hoek.

Scalpellum velutinum, Hoek, Rep. 'Challenger' Cirripedia, 1883, p. 96, pl. iv. figs. 10, 11, pl. ix. figs. 7-9; Gruvel, Exp. 'Travailleur' et 'Talisman,' Cirripèdes, 1902, pp. 56, 136, pl. ii. figs. 3 c, 14, pl. iii. figs. 1, 27-31, pl. iv. figs. 6, 11-22; Pilsbry, Bull. U.S. Nat. Mus. lx. 1907, p. 26, pl. iii. figs. 2, 3; Annandale, Illustr. Zool. 'Investigator,' Crust. Entom. pl. iv. fig. 7 (1908); id. Rec. Indian Mus. ix. 1913, p. 229.

S. eximium, Hoek, Rep. 'Challenger' Cirripedia, 1883, p. 100, pl. iv. figs. 6, 7, pl. ix. figs. 10, 10*.

S. sordidum, Aurivillius, Bull. Soc. Zool. France, xxiii. 1898, p. 190.

S. alatum, Gruvel, Bull. Mus. Paris, vi. 1900, p. 192.

Localities. Lat. 8° 46' S., long. 114° 44' E. (Java-Australia), 400 fath. C./S. 'Recorder.' 1 ♀.

Lat. 10° 45' S., long. 120° 50' E. (Java-Australia), 700 fath. C./S. 'Patrol.' 1 ♀.

Lat. 11° 0' S., long. 121° 30' E. (Java-Australia), 500 fath. C./S. 'Patrol.' 3 ♀.

Lat. 11° 0' S., long. 122° 0' E. (Java-Australia), 600 fath. C./S. 'Patrol.' 3 ♀.

Aden-Zanzibar cable, about 600 fath. C./S. 'Colonia.' 1 ♀.

Remarks. Gruvel and other writers have already admitted a considerable range of variation in the characters of this species, and I therefore record as belonging to it a number of specimens which differ a good deal from one another and from the holotype. Most of the specimens group themselves round Hoek's paratypes from Cape St. Vincent, and with this series the holotype of *S. eximium* may be associated, as well as most of the specimens described or figured by later authors. The holotype of *S. velutinum* differs especially in having much more numerous, narrower, and more closely set peduncular scales. In addition, the tergum is longer and narrower, the scuto-tergal angle of the upper latus is more acute (about 47°), and that valve has no portion of its convex base touching or opposed to the carina.

The specimen recorded above from lat. $10^\circ 45'$ S., long. $120^\circ 50'$ E., differs a good deal from all the others, and is only placed here with some doubt. The width of the carina at the base is hardly more than one-fifth of its length, and the marginal ridges of the roof are wanting altogether in the lower half and only slightly marked towards the apex. The upper latus has the scuto-tergal angle less acute (about 70°), and the curved basal margin extends upwards alongside the carina for some distance, the tergum being correspondingly shorter.

In all the specimens the caudal appendages are rather stout and do not differ greatly in length from the peduncle of the sixth cirrus. They seem to consist of from four to six segments, but, as Gruvel notes, some of the seven or eight segments which he counts are very indistinct. The carina is by no means always, as Pilsbry states, "squarely truncate" below; in many specimens it is rounded or even, as in the holotype of Hoek's *S. eximium*, distinctly angled. In none of our specimens is there any trace of a penis.

Annandale's record from 1200 fathoms (Rec. Ind. Mus. ix. 1903, p. 230) refers, as shown below, not to this but to the next species.

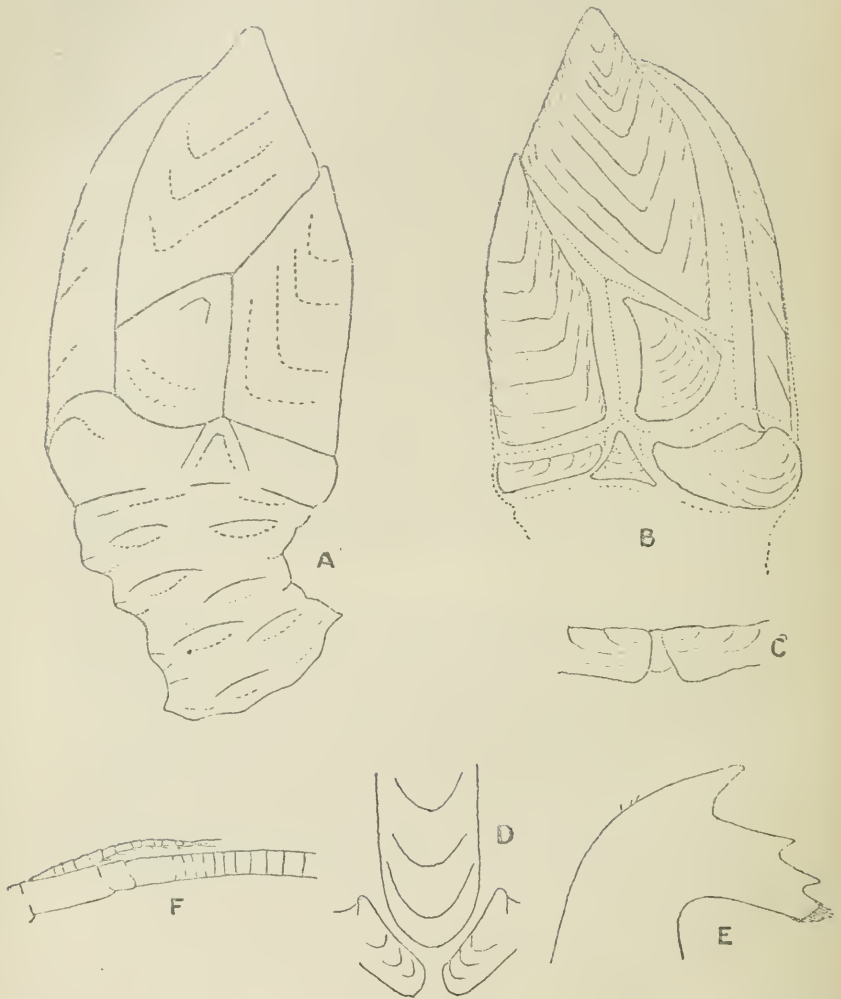
Scalpellum (Scalpellum) annandalei, sp. n.
(Text-fig. 3.)

Locality.—Lat. $14^\circ 20'$ N., long. $52^\circ 30'$ E. (Gulf of Aden), 1200 fath. C./S. 'Electra.' 1 ♂ (holotype).

Lat. $10^\circ 45'$ S., long. $120^\circ 50'$ E. (Java-Australia), 700 fath. C./S. 'Patrol.' 1 ♂ (paratype).

Description.—*Capitulum* oblong-oval, its height more than

Fig. 3.



Scapellum annandalei, holotype.

- A. Lateral view before removal of cuticle. B. Capitulum with cuticle removed to show outline of calcareous valves. C. Rostrum and rostral lacinia. D. Base of carina and carinal lacinia. E. Mandible. F. Base of sixth cirrus and caudal appendage.

half as great again as its width, the 14 valves covered with opaque cuticle, only the umbones exposed (fig. 3, A), the surface with a very short velvety pile; on removing the cuticle the valves are seen to be separated by rather wide chitinous interspaces (fig. 3, B). *Tergum* quadrilateral, with nearly straight sides, about twice as long as wide, with rather widely spaced and not very prominent lines of growth, and with a faint ridge running from the apex to the basal angle; the straight ocelludent margin forms a slight angle with that of the scutum. *Scutum* triangular, with the inner margin obtusely angled about its middle, so that the valve becomes almost quadrilateral, about twice as high as it is wide, apex very slightly recurved, ocelludent margin slightly convex. *Carina* simply bowed, nearly straight in its lower half, umbo apical, touching but not entering between the terga, lower end rounded, more or less widely separated from carinal latera (fig. 3, D); roof strongly convex, not defined from the parietes. *Upper latus* triangular, with umbo at the acute scuto-tergal angle, basal and tergal margins convex, scutal margin concave. *Rostral latera* (fig. 3, C) very low, apices incurved, separated by the minute *rostrum*. *Infra-median latus* small, triangular, about as high as it is wide at the base. *Carinal latus* much wider than high, not projecting behind the carina. umbo at upper end, a more or less distinct ridge extending from umbo to inner angle. The two carinal latera do not meet behind (fig. 3, D).

Peduncle short, with large plates, not imbricated, arranged in six longitudinal rows of about five plates each. Free margins of plates rounded except in the carinal series, where they are bluntly angled.

Mandible (fig. 3, E) with four teeth (including inner angle), the interval between the two distal twice that between the second and third. *Cirri* purplish or greenish. *First cirrus* with rami of about 9 and 14 segments. *Sixth cirrus* with rami of about 36 segments which about the middle bear three pairs of long spines anteriorly with a few finer setae between. *Caudal appendages* (fig. 3, F) in holotype less than twice as long as peduncle of sixth cirrus, with 13 segments, in paratype more than twice as long as peduncle and with 25 segments. *Penis* about as long as caudal appendages, tapering, without conspicuous setae.

Measurements.—Length of capitulum 20 mm., breadth 12.5 mm.; length of peduncle 11 mm., diameter 7 mm.

Remarks.—This species belongs to the group *Areoscalpellum*, and by its wide carinal latera with the umbo

near the upper margin, its valves separated by wide interspaces, and its carina with a rounded roof it is brought into proximity with such forms as *S. giganteum*, Gruvel. From that species it is separated by the narrower and more oblong form of the capitulum with straighter carina, by the differently shaped carinal latus with the upper angle not above the level of the umbo, and by the long and many-jointed caudal appendages.

The specimen described as the holotype formed part of a small collection which was kindly determined for the British Museum some years ago by Dr. Annandale. By some mischance, which cannot now be explained, the specimen was returned bearing the label "*S. velutinum*," although its distinctness from that species seems obvious to a much less practised eye than Dr. Annandale's. Unfortunately the record has been published by Dr. Annandale (Rec. Ind. Mus. ix. 1913, p. 230). The paratype, although from a widely distant locality, agrees very closely with the holotype in external characters. It differs, however, in having the caudal appendages longer and composed of a larger number of segments.

It is possible that the specimen figured by Hoek in his 'Siboga' Report (p. 85, pl. vii. fig. 13) as *S. moluccanum* belongs to the species here described. The figure, however, shows the capitulum to be a good deal wider, and some details of the valves can hardly be reconciled with the specimens examined by me. The true *S. moluccanum*, as represented by the holotype in the 'Challenger' collection, is widely different from the present species; it has the roof of the carina angled in the middle and separated by well-marked angles from the parietes, the valves all in contact or nearly so, the rostral latera much deeper, and the caudal appendages of seven segments.

Scalpellum (Scalpellum) regina, Pilsbry.

Scalpellum regina, Pilsbry, Bull. U.S. Nat. Mus. ix. 1907, p. 31, pl. ii. figs 4-6.

Locality.—Lat. $7^{\circ} 37'$ S., long. $34^{\circ} 26\frac{1}{2}'$ W. (off Pernambuco), 50-150 fath. C./S. 'Norseman.' 2 ♂.

Remarks.—In general these specimens agree so closely with Pilsbry's description and figures that there can be little doubt that they belong to the species described by him. The most conspicuous difference is the greater width of the scutum, which is not twice as long as wide (16×29 mm.).

The carina of one specimen shows faint traces of marginal ridges to the roof. The rostral latus, and especially the inframedian latus, are wider than the figure, the latter valve being about twice as wide as high.

Pilsbry does not describe any of the appendages. The *mandible* has four teeth, the interval between the two distal less than twice that between second and third. The *cirri* are pale. The *first cirrus* has rami not very unequal, with 18 and 20 segments, and the exopod is slender in its distal third. The *sixth cirrus* has 36 segments in the exopod, with five pairs of spines on the middle segments. The *caudal appendages* are about half as long as the sixth cirrus, with 26-30 segments. The *penis* is slightly longer than the caudal appendages, slender, tapering, with a few scattered setæ on its distal part.

Scalpellum (Scalpellum) regulus, sp. n. (Text-fig. 4.)

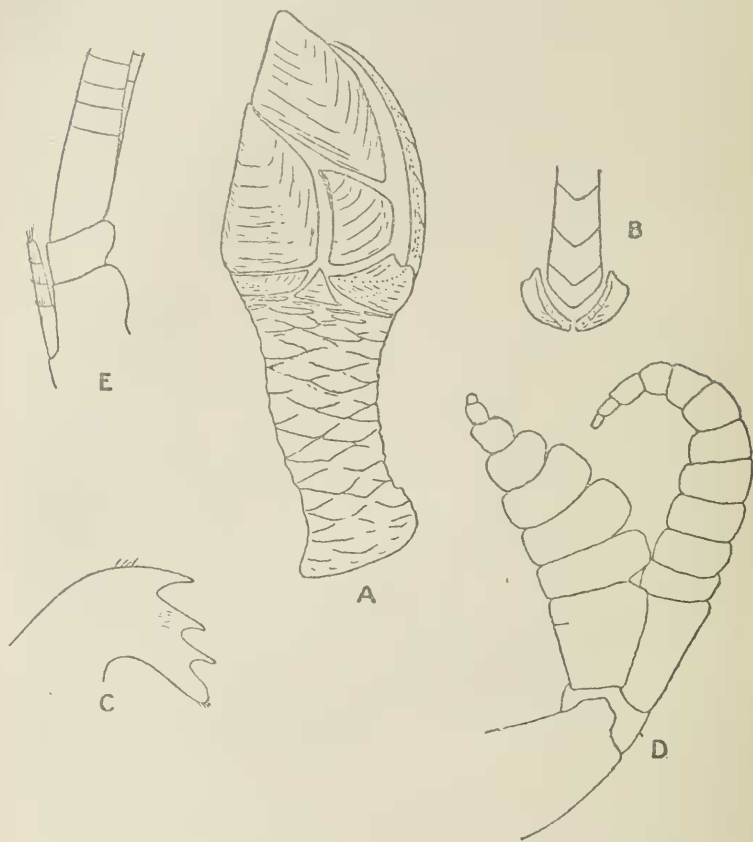
Locality.—Lat. 9° 15' S., long. 115° 10' E. (Java-Australia), 800-1500 fath. C./S. 'Patrol.' 2 ♀.

Description.—Resembling *S. regina*, Pilsbry. Valves covered with opaque velvety cuticle with only the umbones exposed; separated from each other by rather wide chitinous interspaces; with well-marked but not prominent and rather widely-spaced lines of growth. *Tergum* nearly twice as long as wide, occludent margin straight, carinal margin strongly and scutal margin slightly convex; no distinct apico-basal ridge. *Scutum* less than twice as long as wide, occludent margin nearly straight, lateral margin convex, passing without marked angle into the straight tergal margin; apex acuminate, slightly recurved. Carina arcuate throughout its length, less than six times as long as wide at base; umbo apical, entering between terga, roof slightly convex, without marginal ridges, parietes very narrow, at right angles to roof, base rounded or angled. *Upper latus* with tergal margin convex and scutal margin concave, so that the acute apex is turned forwards; carino-basal margin convex, forming an almost even curve. *Rostrum* very small, triangular, separating the rostral latera. *Rostral latus* low, with an oblique ridge from the umbo. *Inframedian latus* triangular, nearly equilateral. *Carinal latus* shaped much as in *S. regina*, but with umbo closely appressed to, and not projecting behind, the carina (fig. 4, B).

Peduncle about as long as capitulum, with large overlapping scales arranged in 10-12 rows of 11-13 scales each.

Mandible (fig. 4, C) with four teeth, interval between the two distal only a little greater than that between second and third. *Cirri* purplish, lighter towards the tip. Rami of

Fig. 4.



Scalpellum regulus, holotype.

- A. Lateral view, with cuticle removed from capitulum. B. Base of carina and carinal latera. C. Mandible. D. First cirrus (setæ omitted). E. Base of sixth cirrus and caudal appendage.

first cirrus (fig. 4, D) with 8 and 12 segments, exopod not very slender distally. *Sixth cirrus* with about 30 segments in exopod, with five pairs of spines on middle segments.

Caudal appendages (fig. 4, E) equal to or a little longer than peduncle of sixth cirrus, of 4 or 5 segments. *Penis* absent.

Measurements.—Length of capitulum 36 mm., breadth 22 mm.; length of peduncle 35 mm., diameter 13 mm.

Remarks.—Regarding only the characters of the capitular plates, the differences separating this species from *S. regina* are so little marked as hardly to suffice for the discrimination of the species. The most important, perhaps, are the form of the upper latus, with its acute and curved apex, and the less projecting umbo of the carinal latus. The value of these differences, however, is greatly enhanced by the very striking differences shown by the appendages. The mandible has a relatively smaller interval between the distal teeth; the cirri are shorter and the rami of the first cirrus have fewer segments; the caudal appendages are very short and composed of few segments, and the penis is absent. In certain characters, such as the form of the upper latus and the number of segments in the cirri and caudal appendages, the species approaches *S. regium*, but it differs widely from it in the form of the carinal latus, which in that species is much higher and has an apical umbo.

Scalpellum (Scalpellum) alcockianum, Annandale.

Scalpellum alcockianum, Annandale, Ann. & Mag. Nat. Hist. (7) xvii. 1906, p. 392; id. Illustr. Zool. 'Investigator,' Crust. Entom. pl. i. fig. 2, pl. ii. figs. 2-2 b (1907); id. Rec. Ind. Mus. ix. 1913, p. 229; id. Mem. Ind. Mus. vi. 1916, p. 129, pl. vi. figs. 5-5 b.

Locality.—Lat. 10° 45' S., long. 120° 50' E. (Java-Australia), 700 fath. C./S. 'Patrol.' I ♀.

Remarks.—The specimen, which has almost exactly the dimensions recorded by Annandale except that the peduncle is a little longer, agrees very well with a somewhat smaller specimen received from the Indian Museum, and apparently one of the syntypes. In both specimens the capitulum is inflated in its upper part, less strongly in the syntype than in the new specimen, where the main swelling seems to be over the areas between the tergum and neighbouring valves; the swelling is not due to a thickening of the wall, but to an expansion of the mantle-cavity.

In the present specimen the calcareous valves are rather more widely separated than in the syntype, the ocludent margins of terga and scuta form an even curve rather than a projecting angle, and the upper latus has its scutal margin more concave. In both specimens the scutum is more than

twice as long as its basal width. In the new specimen the mandible has the proximal tooth more produced and acute than in Annandale's figure and the interval between it and the second equal to that between the second and third teeth; there is no accessory tooth on the inner margin of the distal tooth. The rami of the first cirrus have 10 and 15 segments and the caudal appendages, which are little less than half as long as the sixth cirri, have about 22 segments. No males are attached to either specimen.

In Annandale's key to the Indian species of the subgenus *Scalpellum* (Rec. Ind. Mus. ix. 1913, p. 228) the entry relating to this species should apparently read "margins of tergum moderately excavated," instead of "not excavated."

Scalpellum (Scalpellum) juddi, sp. n.
(Text-figs. 5, 6, 7.)

Localities.—Lat. 11° 0' S., long. 121° 30' E. (Java-Australia), 400 fath. C./S. 'Patrol.' 1 ♀ (holotype).

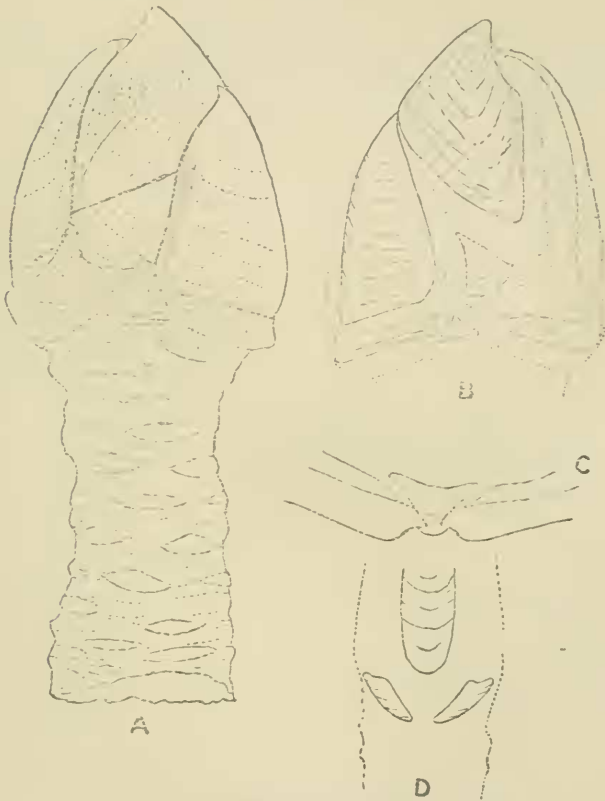
Lat. 10° 25' S., long. 120° 8' E. (Java-Australia), 250 fath. C./S. 'Patrol.' 1 ♀ with ♂♂ (paratype).

Description.—*Female*. *Capitulum* compressed, oval, notched above, with 14 calcareous valves embedded in—and, except at the umbones, entirely concealed by—a thick cartilaginous layer. On the outer surface, which is covered with a very short velvety pubescence, the areas of the valves are defined by grooves and the lines of growth are strongly marked (fig. 5, A). On paring away the cartilaginous layer the calcareous valves are seen to be widely separated, but with the margins not markedly excavated and with the lines of growth shallow and rather widely spaced (fig. 5, B). The following description applies to the calcareous valves, not to the superficial areas, except where the latter are mentioned.

Tergum irregularly triangular, apex projecting above that of carina, recurved; carinal margin angled above the middle, upper portion concave, lower straight or slightly convex; scutal margin slightly sinuous; ocludent margin slightly convex, forming an even curve with margin of scutum. *Scutum* triangular, basal width more than half its height, apex overlapping tergum, ocludent margin slightly convex, other two sides nearly straight, inner angle rounded. *Carina* evenly curved, its apex projecting freely for a short distance and touching or entering between the terga, its base rounded and widely separated from carinal latera; roof strongly convex, defined by a slight ridge on each side from the

narrow parietes (holotype) or slightly convex, forming prominent angles with the parietes (paratype). *Upper latus* triangular, base convex, scutal margin very slightly concave. *Rostrum* (fig. 5, C) a horizontal triangular plate, deeply

Fig. 5.



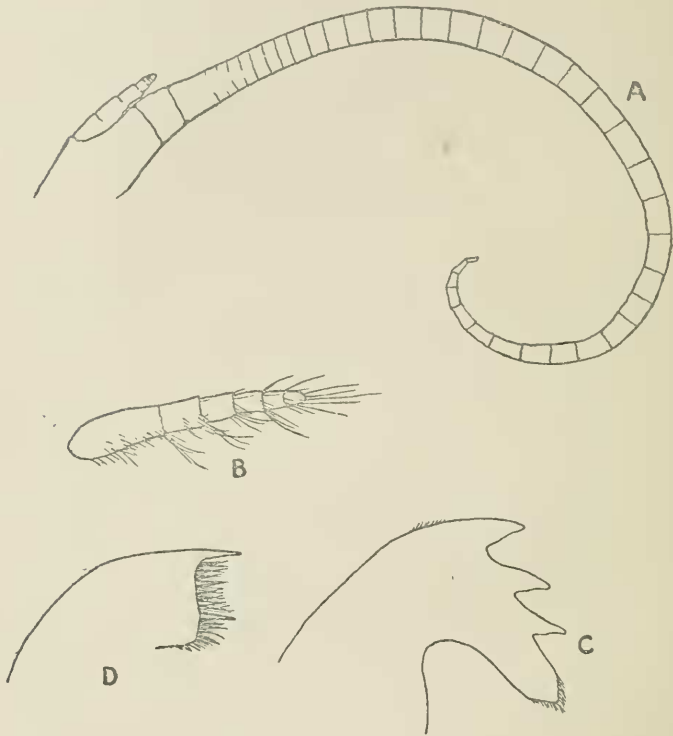
Scalpellum juddi, holotype.

A. Lateral view before removal of cuticle. B. Capitulum with cuticle removed to show outline of calcareous valves. C. Rostrum and rostral latera. D. Base of carina and carinal latera.

embedded, overlapped by rostral latera. *Rostral latus* also nearly horizontal, so that hardly more than the edge is seen in lateral view; apices incurved and separated only by apex

of rostrum. *Inframedian latus* small, triangular, set obliquely with the apex near the surface and the base deeply embedded. *Carinal latus* also set obliquely, much broader than high, with umbo in line with upper margin, recurved and slightly projecting laterally but hardly posteriorly, not meeting its fellow below the carina (fig. 5, D). The outline of the carinal

Fig. 6.

*Scalpellum juddi*, holotype.

- A. Exopod of sixth cirrus and caudal appendage (setae omitted).
 B. Caudal appendage. C. Mandible. D. Maxillula.

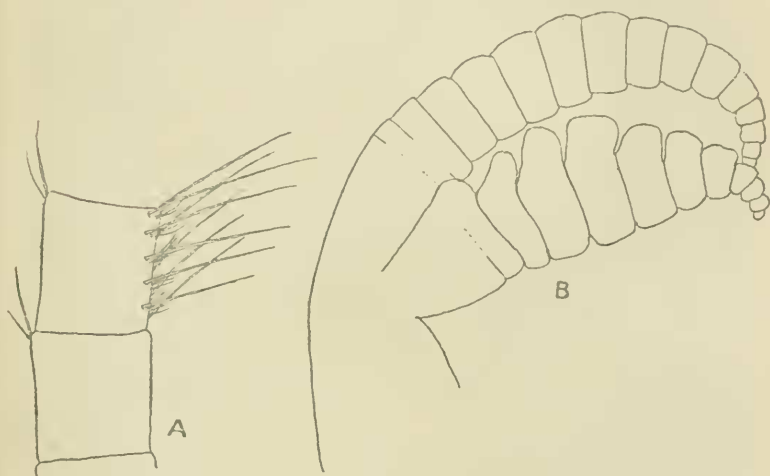
latus as defined by grooves on the external surface differs widely from that of the calcareous valve just described, extending well above the umbo, having three points or angles, one between carina and upper *latus*, one between

upper and inframedian latera, and one meeting the carinal angle of the inframedian latus; to each of these points a strong curved ridge runs from the umbo.

Peduncle about as long as or shorter than capitulum, with large transverse plates, not overlapping, widely spaced in holotype, more closely set in paratype, in five longitudinal rows of 11 to 15 plates.

Mandible (fig. 6, C) with four teeth, the middle interspace the shortest. *Maxillula* (fig. 6, D) with oral edge sinuous, with a large spine at its proximal third and another at its

Fig. 7.

*Scalpellum juddi*, holotype.

A. Segment of exopod of sixth cirrus. B. First cirrus (setae omitted).

distal end. *Cirri* pale purplish. *First cirrus* (fig. 7, B) with exopod much expanded, of 12 segments, endopod of 16. *Sixth cirrus* with about 38 segments in exopod, five pairs of long spines with shorter setae between on middle segments (fig. 7, A). *Caudal appendages* (fig. 6, A, B) equal to peduncle of sixth cirrus, of six segments (holotype), or a little longer than peduncle, of eight segments (paratype). *Penis* absent.

Male. In the paratype about fifteen males and larvæ were attached inside the margin of the scutum on one side and three or four on the other. The males are saccular or flask-shaped, with a very short neck, and the outer surface is

spinose. Four very small calcified valves are clearly visible in some specimens, but in others no trace of these is to be detected.

Measurements.—*Female* (holotype). Length of capitulum 43 mm., breadth 36 mm., thickness 19 mm.; length of peduncle 48 mm., diameter 21 mm.

Male. About 0.8×0.45 mm.

Remarks.—A group of species within the section *Arco-scalpellum* of Hoek is characterized by the great thickness of the cartilaginous substance of the capitulum, so that the calcareous valves are entirely or all but entirely concealed. The group includes, in Oriental seas, *S. alcockianum* and *S. persona*, Annandale, from both of which the species now described is separated by the brevity of the caudal appendages and by various small characters of the calcareous valves, the non-excavated margins of the terga being perhaps the most important. In the Atlantic the most closely related species is *S. giganteum*, Gruvel, which is distinguished by various details of the capitular valves and by the truncate, almost clavate, form of the short caudal appendages. From all these species that now described appears to differ further in the flattened parietes of the carina and in having no penis. This last character is probably of great importance as a specific distinction, although Pilsbry has stated that in *S. regium* the penis may be present or absent (Bull. U.S. Nat. Mus. lx. 1907, p. 28), or, in other words, the large individuals of the species may be either hermaphrodite or purely female*.

The specific name is chosen in recognition of the part taken by Mr. Walter Judd in obtaining for the Museum the very interesting collection now described.

Scalpellum (Scalpellum) persona, Annandale.

Scalpellum persona, Annandale, Jour. Straits Branch. Roy. Asiatic Soc. No. 74, 1916, p. 295, pl. iv. fig. 3, pl. v. figs. 7, 8, pl. vi. figs. 3-5.

Locality.—Lat. $8^{\circ} 46'$ S., long. $114^{\circ} 44'$ E. (Java-Australia), 400 fath. C./S. 'Recorder.' 8 ♀.

Remarks.—The specimens agree well with the descriptions

* Pilsbry implies that only one specimen of *S. regium* was examined by Hoek as to this character. There were at least six syntypes, but only two now survive, and one of these is imperfect; the other has no penis. On the other hand, the holotype of *S. regium*, var. *ovale* (which, from other characters, may possibly deserve specific rank), has a penis.

and figures of Annandale, but the largest is only about two-thirds of the size shown by his figure (no measurements are recorded in the text). Further, the surface of the capitulum, instead of being glabrous, is covered with a very short and fine velvety pubescence with longer hairs scattered at intervals. The largest specimen shows an inflation of the capitulum like that described above in *S. alcockianum*. The angular projection of the peduncular scales is very prominent and characteristic.

The cirri are light-coloured. The caudal appendages are about twice as long as the peduncle of the sixth cirrus and have 13 to 16 segments. No males were found.

Scalpellum (Scalpellum) portoricanum, Pilsbry.

Scalpellum portoricanum, Pilsbry, Bull. U.S. Nat. Mus. lx. 1907, p. 35, text-fig. 8.

Locality.—Lat. 18° 31' N., long. 66° 19' W. (Off Porto Rico), 180 fath. C./S. 'Henry Holmes.' 2 ♂.

Remarks.—The two specimens differ from the description of the typical *S. portoricanum* in having the cuticle covered with a close but very short velvety pile (the subspecies *intonsum* is said to be "rather densely hairy"). The valves are all in contact, as in the figure of the subspecies. The marginal ridges of the carina are obsolescent and the area between them slightly convex; the base of the carina is angled. The carinal latera do not spread outwards quite so much as in the figures. The rostral latus approaches closely the proportions of that figured for the typical form. The inframedian latus is wider at the base than it is high, but shows the characteristic curvature of the apex towards the scutum. The peduncle is as long as the capitulum. The peduncular plates of the larger specimen are more transversely elongated than in the figure of the type and not close-set and overlapping as in that of the subspecies. There are seven longitudinal rows of about eleven plates in the larger specimen. The capitular valves show traces of a reddish colouring arranged in bands following the lines of growth.

Although the larger of our two specimens is more than twice the size of the holotype, the agreement in all characters except those mentioned above appears close enough to warrant its identification with this species.

No account of the appendages is given by Pilsbry. The

following particulars are taken from the larger of our specimens. *Mandible* with four teeth, the interval between the two distal not quite twice that between first and second. *First cirrus* with exopod considerably expanded, segments 12 and 15. *Sixth cirrus* with about 35 segments in exopod, five pairs of spines on middle segments with shorter setae between, no conspicuous setae on inner face of endopod. *Caudal appendages* as long as peduncle of sixth cirrus, slender, with a stouter base, consisting of about 7 segments. *Penis* stout, tapering to an acute tip, at least half as long as sixth cirrus.

This species is evidently closely allied to the Malayan *S. sociabile*, Annandale, a species which, like that of Pilsbry, includes named varieties. As regards the capitular valves, the differences between West Indian and Malayan specimens are not great, the relatively longer carina extending beyond the distal third of the tergum in the present species, and the more complete disappearance of the marginal ridges of that valve in *S. sociabile* being perhaps the most important. The scuto-tergal angle of the upper latus is more acute in *S. sociabile*. The caudal appendages, however, differ considerably. In *S. sociabile* the basal segment is greatly expanded, and exceeds the length of the distal segments together. In *S. portoricanum* the basal segment is little expanded and not more than half as long as the distal portion.

If our specimens are correctly identified with Pilsbry's species their occurrence so near the type-locality is suggestive of a very restricted area of distribution.

Scalpellum (Scalpellum) rubrum, Hoek.

Scalpellum rubrum, Hoek, Rep. 'Challenger' Cirripedia, 1883, p. 91, pl. iv. fig. 18; Pilsbry, Bull. Bur. Fish. Washington, xxix. 1911, p. 62, pl. viii. figs. 1-4, text-fig. 1.

Locality.—Lat. $7^{\circ} 35' S.$, long. $114^{\circ} 30' 30'' E.$ (Java Sea), 73-175 fath. C./S. 'Recorder.' 1 ♂.

Remarks.—The holotype in the 'Challenger' collection is very minute (length of capitulum 5 mm.), but Pilsbry has described and figured specimens of 17 mm. capitular length. The specimen in the present collection is nearly twice as large (capit. length 32 mm.) as those described by Pilsbry, but is without doubt referable to the same species. It shows no trace of red coloration except on the upper part of the roof of the carina. The tergum is more than twice

as long as wide and its occludent margin is nearly straight. The rostral latus is a good deal lower than in Pilsbry's figure and the inframedian latus is twice as broad at the base as it is high. The fifth cirri have about 25 segments, the median ones with four to five pairs of large and one pair of smaller spines anteriorly, and five to seven setæ on inner face of middle segments of endopod. The caudal appendages are very slender and have about 20 segments. The penis is about half as long as the sixth pair of cirri, stout, tapering, and pilose except near the tip. Pilsbry describes it as "extremely long and slender, with some short, very sparsely scattered, hairs." In other respects the specimen agrees very well with Pilsbry's account. The minute holotype, which is now somewhat imperfect, agrees generally with Pilsbry's figure, although with slight differences in the proportions of the plates, no doubt correlated with the great difference in size. The caudal appendages have about 6 or 7 segments and do not exceed the peduncle of the sixth cirri in length. One characteristic feature shown by the holotype, by Pilsbry's figure, and very conspicuously by the present specimen, is the prominence of the carinal row of peduncular plates which project as a series of teeth, bluntly angular and slightly curved downwards.

Scalpellum (Scalpellum) novæ-zelandiæ. Hoek.

Scalpellum novæ-zelandiæ, Hoek, Rep. 'Challenger' Cirripedia, 1883, p. 124, pl. v. figs. 7, 8; Gravel, Exp. 'Travailleur' et 'Talisman,' Cirrhipèdes, 1902, p. 54, pl. ii. figs. 12, 13, 15; Annandale, Illustr. Zool. 'Investigator' Crust. Entom. pl. v. fig. 7 (1908); id. Rec. Ind. Mus. ix. 1913, p. 231.

Locality.—Lat. 14° 20' N., long. 52° 30' E. (Gulf of Aden), 1200 fath. C. S. 'Electra.' 2 ♀.

Remarks.—Our specimens were identified by Dr. Annandale and I leave them under the name which he gave them. It is to be noted, however, that the larger of the two (capitular length 17 mm.) has the roof of the carina distinctly convex and the apex extending further towards the tip of the tergum than it does in the holotype. Both features tend to assimilate the specimen to the closely allied *S. flavum*, Hoek. The other specimen differs still more from the holotype, but as it is much damaged it seems unnecessary to discuss its characters at length.

Scalpellum (Scalpellum) gruevelii, Annandale.

Scalpellum gruevelii, and var. *quadratum*, Annandale, Ann. & Mag. Nat. Hist. (7) xvii. 1906, p. 390; id. Herdman's Rep. Ceylon Pearl Oyster Fisheries, Roy. Soc. v. 1906, p. 141, text-fig. 4; id. Illustr. Zool. 'Investigator,' Crust. Entom. pl. i. fig. 1, pl. ii. figs. 1, 1 a, 3 (1907); id. Rec. Ind. Mus. ix. 1913, p. 232.

Scalpellum chitinosum, Hoek, 'Siboga' Exp., Cirripedia Pedunculata, 1907, p. 73, pl. vii. fig. 4.

Localities.—Lat. 12° N., long. 46° E. (Gulf of Aden), 770 fath. C./S. 'Colonia.' 1 ♀.

Lat. 14° 20' N., long. 52° 30' E. (Gulf of Aden), 1200 fath. C./S. 'Electra.' 1 ♀. (Annandale det.)

Remarks.—In view of the variability which Annandale attributes to this species, and of the fact that one of the specimens was determined by him, they may both be recorded under this name, although I am not altogether satisfied as to the characters that are said to distinguish the species from some others, such as *S. curiosum*, Hoek. In the characters of the cirri and of the mandible one of our specimens agrees well with the figures given by Pilsbry (Bull. U.S. Nat. Mus. lx. 1907, p. 75) for his *S. imperfectum*, which Annandale suggests as a possible synonym for this species.

Scalpellum (Scalpellum) laccadivicum, Annandale.

Scalpellum laccadivicum and var. *investigatoris*, Annandale, Ann. & Mag. Nat. Hist. (7) xvii. 1906, p. 393; id. Illustr. Zool. 'Investigator,' Crust. Entom. pl. i. figs. 3, 4 (1907); id. Rec. Ind. Mus. ix. 1913, p. 235.

Scalpellum subflavum, id. Ann. & Mag. Nat. Hist. (7) xvii. 1906, p. 397; id. Illustr. Zool. 'Investigator,' Crust. Entom. pl. i. fig. 6 (1907).

Scalpellum polymorphum, Hoek, 'Siboga' Exp., Cirripedia Pedunculata, 1907, p. 80, pl. vii. figs. 9-11.

Locality.—Lat. 8° 46' S., long. 114° 44' E. (Java-Australia), 400 fath. C./S. 'Recorder.' 1 ♀.

Remarks.—The synonymy given by Annandale and reproduced above implies a range of variation that may well include our single specimen which approaches Annandale's *S. subflavum*. It seems also possible that *S. longius* and *S. lambda*, Annandale, concerning the specific distinctness of which from one another Annandale expresses himself as doubtful, might also be included within the limits of the same specific name.